Calculus II, Exam IV, Spring 2012

Name:_____

Student signature:_____

Show all your work and give reasons for your answers. Good luck!

(1) (6 points) Find the sum of the series $\sum_{n=0}^{\infty} \frac{1}{3^n} = 1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \dots$

(2) (10 points)Test the following series for absolute or conditional convergence, or divergence: $\sum_{n=1}^{\infty} \frac{(-1)^n n^3}{\sqrt{n^9+n^6}}$

(3) (12 points) Find the interval and radius of convergence for $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}x^n}{n^2}$.

(4) (18 points) Find the MacLaurin series and state the radius of convergence for $f(x) = \ln(1 + 3x)$.

(5) (18 points) Find the MacLaurin series and state the radius of convergence for $g(x) = \frac{x^2}{7+x}$.

(6) (18 points) Use the MacLaurin series to evaluate $\sin(1/10)$ with an error less than 10^{-5}.

(7) (18 points) Use the MacLaurin series to approximate $\int_0^{1/10} \sin(x^2)\, dx$ with an error less than 10^{-5}.